WHAT IS CLAIMED IS:

Sub A1

1. A method for communicating at least two source signals from a first location toward a second location, the method comprising:

    a) generating a local oscillator signal for each of the at least two source signals;

    b) selecting signals from among the at least two source signals to define selected source signals;

    c) separately mixing each of the selected source signals with a corresponding local oscillator signal to generate mixed selected signals;

    d) combining the mixed selected signals to generate a transmission signal; and

    e) transmitting the transmission signal towards the second location.

2. The method of claim 1 further comprising:

    - converting the transmission signal to an optical signal before transmitting the transmission signal towards the second location.

3. The method of claim 1 wherein the act of generating a local oscillator signal for each of the at least two source signals includes:

    i) accepting a pilot carrier;

    ii) generating a first local oscillator signal based on the pilot carrier; and

iii) generating an n^{th} local oscillator signal by dividing the first local oscillator signal by 2^{n-1}.

4. The method of claim 3 wherein the pilot carrier has a frequency of approximately 120 MHz.

5. The method of claim 3 wherein the act of generating a first local oscillator signal based on the pilot carrier is performed by dividing the pilot carrier by a selected one of two and three.

6. The method of claim 3 wherein the each of the local oscillator signals has a square waveform.

7. The method of claim 3 wherein the n^{th} local oscillator signal has less noise than the $(n-1)^{th}$ local oscillator signal.

8. The method of claim 3 wherein the one of the at least two source signals associated with the n^{th} local oscillator signal requires less bandwidth than the one of the at least two source signals associated with the $(n-1)^{th}$ local oscillator signal.

9. A method for communicating at least two source signals from a first location to a second location, the method comprising:

a) generating a source local oscillator signal for each of the at least two source signals;

b) selecting signals from among the at least two source signals to define selected source signals;

c) separately mixing each of the selected source signals with a corresponding source local oscillator signal to generate mixed selected signals;

d) combining the mixed selected signals to generate a transmission signal;

e) transmitting the transmission signal to the second location;

f) receiving the transmitted transmission signal at the second location;

g) splitting the received transmission signal to generate mixed selected signals;

h) generating a destination local oscillator signal for each of the at least two source signals;

i) separately demodulating each of the mixed selected signals using corresponding ones of the destination local oscillator signals, to generate the selected source signals.

10. The method of claim 9 further comprising:

- converting the transmission signal to an optical signal before transmitting the transmission signal towards the second location; and

- converting the received transmission signal to an electrical signal before splitting it.

11. The method of claim 9 wherein the act of generating a source local oscillator signal for each of the at least two source signals includes:

i) accepting a pilot carrier;

ii) generating a first source local oscillator signal based on the pilot carrier; and

iii) generating an n^{th} source local oscillator signal by dividing the first source local oscillator signal by 2^{n-1},

and wherein the act of generating a destination local oscillator signal for each of the at least two source signals includes:

i) accepting the pilot carrier;

ii) generating a first destination local oscillator signal based on the pilot carrier; and

iii) generating an n^{th} destination local oscillator signal by dividing the first destination local oscillator signal by 2^{n-1}.

12. The method of claim 11 wherein the pilot carrier has a frequency of approximately 120 MHz.

13. The method of claim 9 wherein the source and destination local oscillator signals are coherent.

14. A method for receiving at least two source signals, transmitted from a first location, by a second location, the method comprising:

a) receiving a transmitted signal at the second location;

b) splitting the received signal to generate mixed selected signals;

c) generating a local oscillator signal for each of the at least two source signals; and

d) separately demodulating each of the mixed selected signals using corresponding ones of the second local

oscillator signals, to generate the selected source signals.

15. The method of claim 14 further comprising:

- converting the received transmitted signal to an electrical signal before it is split.

16. The method of claim 14 wherein the act of generating a local oscillator signal for each of the at least two source signals includes:

i) accepting a pilot carrier;

ii) generating a first local oscillator signal based on the pilot carrier; and

iii) generating an n^{th} local oscillator signal by dividing the first local oscillator signal by 2^{n-1}.

17. The method of claim 16 wherein the pilot carrier has a frequency of approximately 120 MHz.

18. The method of claim 16 wherein the act of generating a first local oscillator signal based on the pilot carrier is performed by dividing the pilot carrier by a selected one of two and three.

19. The method of claim 16 wherein the each of the local oscillator signals has a square waveform.

20. The method of claim 16 wherein the n^{th} local oscillator signal has less noise than the $(n-1)^{th}$ local oscillator signal.

21. The method of claim 16 wherein the one of the at least two source signals associated with the n^{th} local oscillator signal requires less bandwidth than the one of the at least two source signals associated with the $(n-1)^{th}$ local oscillator signal.

22. A transmitter for transmitting selected ones of at least two source signals, the transmitter comprising:

a) an n-stage ripple counter for generating a local oscillator signal for each of the at least two source signals;

b) a selector for selecting signals from among the at least two source signals to define selected source signals;

c) a plurality of mixers, the plurality of mixers

i) having a first set of inputs coupled with the selector for accepting the selected source signals,

ii) having a second set of inputs coupled with the n-stage ripple counter for accepting the local oscillator signals,

iii) being adapted to separately mix each of the selected source signals with a corresponding one of the local oscillator signals to generate mixed selected signals, and

iv) having a set of outputs for providing the mixed selected signals; and

d) an n-way combiner, the n-way combiner having a set of inputs coupled with the set of outputs of the mixer, and being adapted to combine the mixed selected signals to generate a transmission signal.

23. The transmitter of claim 22 further comprising:

e) an electrical to optical converter, coupled with the n-way combiner and being adapted to convert the transmission signal to an optical signal.

24. The transmitter of claim 22 wherein the ripple counter:

i) generates a first local oscillator signal based on a pilot carrier; and

ii) generates an n^{th} local oscillator signal by dividing the first local oscillator signal by 2^{n-1}.

25. The transmitter of claim 24 wherein the pilot carrier has a frequency of approximately 120 MHz.

26. The transmitter of claim 24 wherein the ripple counter generates the n^{th} local oscillator signal with less noise than the $(n-1)^{th}$ local oscillator signal.

27. The transmitter of claim 24 wherein the one of the at least two source signals associated with the n^{th} local oscillator signal requires less bandwidth than the one of the at least two source signals associated with the $(n-1)^{th}$ local oscillator signal.

28. A receiver for receiving at least two source signals, transmitted from a first location, the receiver comprising:

a) an n-way splitter, the n-way splitter

i) having an input for accepting a signal,

ii) being adapted to split the received signal to generate mixed selected signals, and

iii) having a set of outputs for providing the mixed selected signals;

b) an n-stage ripple counter, the n-stage ripple counter

i) adapted to generate a local oscillator signal for each of the at least two source signals, and

ii) having a set of outputs for providing the local oscillator signals; and

d) a plurality of mixers, the plurality of mixers

i) having a first set of inputs coupled with the set of outputs of the n-way splitter,

ii) having a second set of inputs coupled with the set of outputs of the n-stage ripple counter, and

iii) adapted to separately demodulate each of the mixed selected signals at its first second of inputs using corresponding ones of the second local oscillator signals at its second set of inputs, to generate the selected source signals.

29. The receiver of claim 28 wherein the n-stage ripple counter is adapted to:

i) generate a first local oscillator signal based on a pilot carrier; and

ii) generate an n^{th} local oscillator signal by dividing the first local oscillator signal by 2^{n-1}.

30. The receiver of claim 29 wherein the pilot carrier has a frequency of approximately 120 MHz.

31. The receiver of claim 29 wherein the each of the local oscillator signals generated by the n-stage ripple counter has a square waveform.

32. The receiver of claim 29 wherein n-stage ripple counter generates the n^{th} local oscillator signal with less noise than the $(n-1)^{th}$ local oscillator signal.

33. The receiver of claim 29 wherein the one of the at least two source signals associated with the n^{th} local oscillator signal requires less bandwidth than the one of the at least two source signals associated with the $(n-1)^{th}$ local oscillator signal.

34. A method for communicating at least two downstream signals from a first location to a second location and for communicating at least two upstream signals from the second location to the first location, the method comprising:

a) generating a downstream source local oscillator signal for each of the at least two downstream signals;

b) selecting signals from among the at least two downstream signals to define selected downstream signals;

c) separately mixing each of the selected downstream signals with a corresponding downstream source local oscillator signal to generate mixed selected downstream signals;

d) combining the mixed selected downstream signals to generate a downstream transmission signal;

e) transmitting the downstream transmission signal to the second location;

f) receiving the transmitted downstream transmission signal at the second location;

g) splitting the received downstream transmission signal to generate mixed selected downstream signals;

h) generating a downstream destination local oscillator signal for each of the at least two downstream signals;

i) separately demodulating each of the mixed selected downstream signals using corresponding ones of the downstream destination local oscillator signals, to generate the selected downstream signals;

j) generating an upstream source local oscillator signal for each of the at least two upstream signals;

k) separately mixing each of the upstream signals with a corresponding source upstream local oscillator signal to generate mixed upstream signals;

l) combining the mixed upstream signals to generate an upstream transmission signal;

m) transmitting the upstream transmission signal to the first location;

n) receiving the transmitted upstream transmission signal at the first location;

o) splitting the received upstream transmission signal to generate mixed upstream signals;

p) generating a upstream destination local oscillator signal for each of the at least two upstream signals; and

q) separately demodulating each of the mixed upstream signals using corresponding ones of the upstream destination local oscillator signals, to generate the upstream signals.

35. The method of claim 34 further comprising:

- converting the downstream transmission signal to a first optical signal before transmitting the transmission signal towards the second location; and
- converting the upstream transmission signal to a second optical signal before transmitting the transmission signal towards the first location,

wherein the first and second optical signals have different wavelengths.

36. The method of claim 34 wherein the act of generating a downstream source local oscillator signal for each of the at least two downstream signals includes:

i) accepting a pilot carrier;

ii) generating a first downstream source local oscillator signal by dividing the pilot carrier by a first number; and

iii) generating an n^{th} downstream source local oscillator signal by dividing the first downstream source local oscillator signal by 2^{n-1},

wherein the act of generating a downstream destination local oscillator signal for each of the at least two source signals includes:

i) accepting the pilot carrier;

ii) generating a first downstream destination local oscillator signal by dividing the pilot carrier by the first number; and

iii) generating an n^{th} downstream destination local oscillator signal by dividing the first downstream destination local oscillator signal by 2^{n-1},

wherein the act of generating an upstream source local oscillator signal for each of the at least two upstream signals includes:

i) accepting the pilot carrier;

ii) generating a first upstream source local oscillator signal by dividing the pilot carrier by a second number, the second number being different from the first number; and

iii) generating an n^{th} upstream source local oscillator signal by dividing the first upstream source local oscillator signal by 2^{n-1}, and

wherein the act of generating an upstream destination local oscillator signal for each of the at least two upstream signals includes:

i) accepting the pilot carrier;

ii) generating a first upstream destination local oscillator signal by dividing the pilot carrier by the second number; and

iii) generating an n^{th} upstream destination local oscillator signal by dividing the first upstream destination local oscillator signal by 2^{n-1}.

37. The method of claim 36 wherein the pilot carrier has a frequency of approximately 120 MHz.